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# Taking Action: Extending Participatory Action Design Research with Design Thinking

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# Taking Action: Extending Participatory Action Design Research with Design Thinking

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**Abstract** Digital transformation adds new possibilities but also more complexity to people's everyday life. To address complex problems within the field of Information System Research, it is advisable to include a variety of stakeholders into the research and design process. Therefore, it is not only necessary to locate the problem solution within the realm where the problem occurs, but also to get the input of the people who have the appropriate insights. In this paper, we propose to use Design Thinking as a course of action for the conduction of particaptory Action Design Research projects.

**Keywords:** • Participatory Action Design Research • Participation • Design Thinking • Research Methodology • IS Research •

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## 1 Introduction

The digital transformation brings great changes not only to businesses but to whole societies. With new technologies for social interaction, teamwork and participation, this ongoing process yields a lot of improvements. At the same time the world we are living in gets more and more complex. If we want to improve people's lifes in a world of high complexity by technological innovation and benefit from the new possibilities digital transformation has to offer, it is a good idea to let the actual users be part of the design and development of new and innovativ information systems. Otherwise it is questionable whether the user's needs are first really understood and second actually met.

In business contexts, this concept is called co-creation (Zwass, 2010). The advantage co-creation provides, is the specific knowledge end-users can contribute to the design process. Outside of business contexts, this idea is referred to as Participatory Design (PD) (Kensing & Blomberg, 1998).

In Information System Research, the idea of designing better solutions for business problems as the key concept of a research project is Design Science Research (DSR) (Hevner, March, Park, & Ram, 2004). DSR is critized, as it does not consider the context in which the problem occurs. To approach this, Sein et al. (2011) suggested to conduct DSR including elements from Action Research (AR), where researchers take an active part in the research process and try to come up with solutions within the problem context (Iivari, 2005). In conclusion Action Design Research (ADR) was introduced.

However, ADR focusses on organizational and business needs and is lacking the integration of a larger variety of stakeholders into the design process, which has been identified as highly beneficial, similar as co-creation concepts. Ongoing research addresses this issue by carrying out ADR in a participatory manner (Bilandzic & Venable, 2011; Haj-Bolouri, Bernhardsson & Rossi, 2016). Derived from PD (Kensing & Blomberg, 1998), participatory ADR refers to the paradigm of letting developers, practioners and end-users take part in every single step of the research process instead of solely including them as survey participants or for experimental observations (Haj-Bolouri et al., 2016). Even though, participatory ADR-frameworks are rigoursly derived and developed from theory and address an important aspect, they lack in providing a clear, easy to follow and structured

process model which inhibits their practical applicability. A clear methodology could foster not only the understanding of the problem and cohesion among research participants, but also support the development of new and innovative solutions for the proposed research questions.

In this paper we introduce a structured framework for an adapted Design Thinking (DT) workshop as a course of action, to carry out the *Action Taking* part of participatory ADR projects (see Figure 1). The DT mindset is ideally suited to work on innovative solutions for complex problems in diverse teams (Buchanan, 1992). Therefore, we first give an introduction into the basic ADR concepts as well as the particpatory ADR advancements by Haj-Bolouri, Bernhardsson & Rossi (2016) and Bilandzic & Venable (2011). After that, we focus on the DT procedure in detail and give an explanation, why we think it is ideally suited for *Action Taking* in participatory ADR projects (see Figure 2). We close with a description of our proposed research methodology as well as a description of how we plan to proceed in order to evaluate and validate our approach. In Table 1 we provided an overview of the research paradigms and concepts we used.

## 2 Related Research

### 2.1 Action Design Research

To understand the specifics of ADR, it is important to know what its origin is. ADR is a combined method of AR and DSR. AR itself is a change-oriented approach, with which social processes can be studied by researcher guided changes, of which effects are then monitored (Baskerville et al., 2018). DSR combines behavioral science and design science and adds rigor and theory to the design of artifacts (Hevner et al., 2004). Within DSR, an existing knowledge base with applicable theories contributes to the development of the artifact and an assessment of the artifact with existing methods from the knowledge base, ensures a rigorous justification of the results and demonstration of the artifact (Hevner et al., 2004). Pefferset al. (2008) further developed a nominal DSR process model that aims to integrate a systematic process, practices and principles for implementing a consistent DSR project. This model aims to strengthen the recognition and legitimacy of DSR and provides guidance to researchers in the execution and presentation of DSR. In contrast, ADR was first introduced by Iivari (2005) and further seminally investigated by Sein et al. (2011). Compared

to DSR's problem and theory-based approach, ADR considers organizational and practical activities and problems (Hevner et al., 2004; Sein et al., 2011) to better understand the values, interests and assumptions of an organization (Orlikowski & Baroudi, 1991). The design of the artifact is iterative and in close collaboration with the organization. Sein et al. criticize the separation of design and evaluation and the sequential process models in DSR and argue that a closer link between these two aspects is necessary, which can be achieved by the researchers' intervention.

This interplay of design and evaluation is important for a comprehensively ensembled artifact, that is iteratively developed between the researcher and the organization. Combining AR with DSR has been proven to be beneficial to situate the problem in real life contexts (Iivari & Venable, 2009; Sein et al., 2011). Sein et al. describe the concept itself as "[...] a research method for generating prescriptive design knowledge through building and evaluating ensemble IT artifacts in an organizational setting.".

## 2.2 Participatory Action Design Research and Citizen Science

In 2011, Bilandzic and Venable presented an advance of the ADR methodology to adapt the research paradigm to the field of Urban Informatics (UI). The objective of UI is in strong contrast with the objective of the original DSR paradigm, which focuses on generating innovative solutions for business needs (Hevner et al., 2004). Bilandzic and Venable state that in order to meet the requirements of the field of UI, namely improving people's everyday life, one should include citizens into the development and design of innovative (software) artifacts. In general, the integration of ordinary citizens in academic research processes is called Citizen Science (CS) (European Union, 2013). The aspect of involving non-scientific stakeholders links both research paradigms, CS and participatory ADR. Subsequently, CS and participatory ADR stand for the same idea, with CS describing the paradigm and participatory ADR describing the specific approach.

One main advantage of integrating stakeholders in the design process is the problem-related knowledge they can provide. This is even more important since ADR projects are situated in the same environment as the problem to be solved. To meet these preconditions, Bilandzic and Venable suggest „[…] that suitable

techniques be borrowed from other Action Research approaches […]." (Bilandzic & Venable, 2011 p. 9).

Another suggestion to open the research process to co-researchers is the PADRE-framework. Haj-Bolouri et al. (2016) describe their concept as an „[…] elaborate version of the ADR method […].". Instead of conducting a reflection and learning process within the stakeholder group solely at the end of the research process (Bilandzic & Venable, 2011) (see Figure 2), Haj-Bolouri et al. suggest to integrate a reflection and learning process in each and every step of the participatory ADR project. However, both approaches stress the importance of integrating external stakeholders, but lack a specific methodology and process on how this integration can be achieved. Therefore, we suggest to use the DT approach for the conduction of participatory ADR projects.

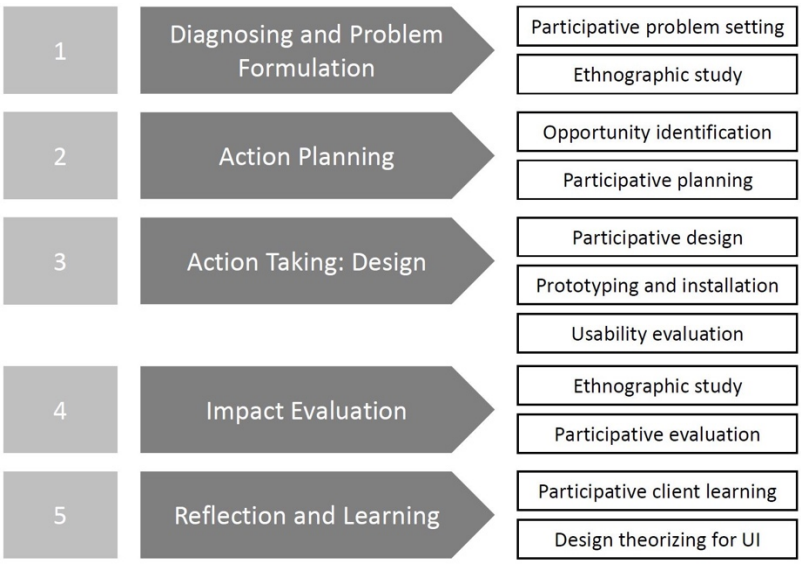


**Figure 8: PADR Framework (Bilandzic & Venable, 2011)**

**Table 3: Overview of research paradigms and frameworks**

| Concept/Paradigm | Key characteristics | Reference |
|---|---|---|
| Design Science Research (DSR) | Theory driven design approach for business needs | Hevner et al., 2004 |
| Participatory Design (PD) | Inclusion of (non-scientific) stakeholders into the design process | Kensing & Blomberg, 1998 |
| Action Design Research (ADR) | Design orientied research approach but with the researcher as active participant | Iivari & Venable, 2009; Sein et al., 2011 |
| Citizen Science (CS) | Inclusion of citizens into every aspect of the research process from topic selection to presentation of results | Dickinson et al., 2012; European Union, 2013 |
| Participatory Action Design Research (participatory ADR) | Combination of DSR, PD, ADR and CS to form an integrated framework for research working together with a variety of stakeholders on design solutions for business and public problems | Bilandzic & Venable, 2011; Haj-Bolouri et al., 2016 |
| Design Thinking (DT) | User-centric and structured collection of methods for working on innovative solutions for complex problems with the integration of a broad variety of stakeholders | Hasso Plattner Institute, n.d.; Lindberg, Meinel & Wagner, 2011 |

## 3 Approaching Participatory ADR with a Design Thinking Procedure

In the following section, we propose a process model for integrating participtory ADR research through the use of a structured DT procedure for Information Systems Research.

### 3.1 Design Thinking

DT-Workshops are ideally suited for generating innovative ideas targeting complex problems (Johansson-Sköldberg, Woodilla & Çetinkaya, 2013). With their high level of inclusion, the focus on solving complex problems and the objection to create innovative artifacts as well as to evaluate the idea's effectiveness, DT-Workshops are a perfect fit for participatory research endeavors. Therefore, we would like to explain in detail the steps we suggest for this process. DT is a customer-centered, participatory, problem-solving method, which contains various steps and iterations (Brown, 2008). Regular DT is carried out in form of workshops and includes a heterogenic group of people. The duration and extent of these workshops differ, as there are many different versions of DT processes. Some interpretations of the process are based on a three-step process, while others are more detailed and show themselves as a nine-step process. Several adaptions of the basic DT-process exist for specific contexts like e.g. innovation processes for industrial services providing specific steps for instance for the development of detailed business models (Redlich et al., 2018).

For our approach, we decided to follow the process of the Hasso-Plattner-Institute of Design at Stanford University in California, where DT was first developed. It is an easy to follow, well documented version of the DT-process, which offers enough flexibility to be used for a large number of research topics. The steps included in this process are *Empathize*, *Define*, *Ideate*, *Prototype* and *Test* (Harris, 2016; Lindberg et al., 2011). Each DT workshop starts with a design challenge. These challenges are expressed by a so called *How Might We* question (Siemon, Becker & Robra-Bissantz, 2018).

In the *Empathize* step, it is necessary to build up an understanding of the human being behind the problem. Therefore, possible activities are general research, interviews and observations to get to know the customer and his or her problems. After gathering enough customer information, an aggregation of this information takes place. This task is followed in the step *Define*. The objective of this step is the definition of the problem, respectively the problem space, to be worked on. This is very important, because all following steps will build on the correct framing of the problem. Finally, the *Ideate* step aims at the generation of many ideas. Typical tasks in this phase are for most of the time brainstorming techniques in various forms. The participants of the DT-process are encouraged to think in all directions and without boundaries like costs or feasibility (Hasso Plattner Institute, 2019). After that, the workshop participants select and transfer the most promising ideas into the *Prototype* step.

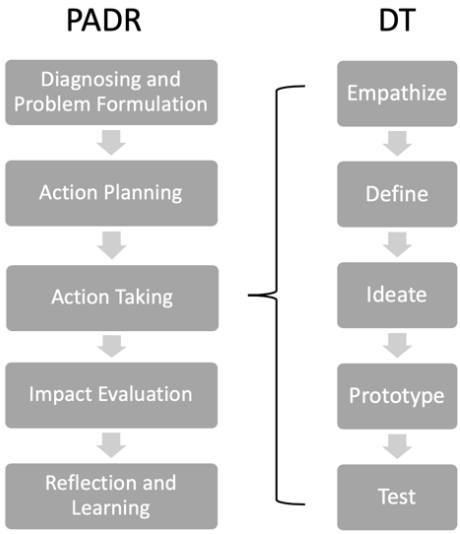


**Figure 2: Integrating Design Thinking in the participatory ADR process of Bilandzic & Venable (2011)**

Here, the DT-workshop participants themselves build prototypes of various complexity. The goal for the prototype is that the functionality behind the innovative idea can be tested in the last process step; *Test*. DT processes and even specific methods for each step are diverse but very well documented online[1],

[1] https://dschool.stanford.edu/resources

which allows for the workshops to be conducted not only by qualified DT-trainers but also researchers, practioners or anyone interested in collaborattive problem-solving.

### 3.2 Design Thinking characteristics

To understand why we think conducting DT-workshops is the logical process to follow for participatory ADR workshops, we want to explicitly look at the advantages the process has to offer. Besides generating innovations, DT-workshops have a strong focus on dealing with and understanding the actual problem before any efforts towards a solution are made. The first three steps of the process, as described above, focus on comprehending the underlying problem of the stakeholders. This is necessary to overcome alleged problem causes. In these steps, the workshop participants intensively learn about the perspective of other stakeholders and the design challenge in general. This learning would not be possible if only a certain group of stakehodlers would participate in the workshops. Therefore, it is inevitable to have a diverse group of participants for the workshops to be successful. For every non-organisational design challenge, this calls for the integration of citizens following the CS-paradigm as mentioned above. The different points of view on the design challenge are what makes participatory research and the DT process model so unique and beneficial.

**Table 4: Examples for Design Thinking Methods, see footnote 77.**

| **Design Thinking Phase** | **Possible Methods (selection)** |
|---|---|
| Emphasize | Persona, Service Blueprint, Interview for Empathy, |
| Define | How Might We-Question, SWOT-Analysis |
| Ideate | Brainstorming, 6 Thinking Hats, Gut Check, Voting, 6-3-5 Method |
| Prototype | Business Plan, Story Board, Rapid Prototyping, Ways to Grow Framework, Paper Prototype |
| Test | Role Play, World Café, UX-Testing, Elevator Pitch |

https://designthinking-methoden.de

## 4 Conclusion and Future Research Agenda

In this paper we have given an overview of existing approaches to combine participation paradigms with design orientied research in Information System Research or respectively UI. We suggest advancing these approaches with a well described and established methodology for particpative innovation workshops. With this contribution we provide a straight forward and easy to follow process model for researchers and practioners alike, who want to include stakeholders into their design-orientied research processes. The main advantage of DT is the well documented workshop structure with enough flexibility and room for adaptation to fit a wide variety of research scenarios. A comparison between the different approaches can be found in Table 3. Beyond that, an easy to follow and coherent research model could hold the possibility to narrow the gap and foster the understanding between research and society.

**Table 5: Compariosn of research paradigms and frameworks**

| | AR | DSR | ADR | Participatory ADR | Participatory ADR with DT |
|---|---|---|---|---|---|
| Social and Behavioral Aspects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Design Research | | ✓ | ✓ | ✓ | ✓ |
| Contextual Aspects | | | ✓ | ✓ | ✓ |
| Stakeholder Involvement | | | | ✓ | ✓ |
| Pratical Applicability | | | | | ✓ |

Therefore, the research questions we want to adress with the case study and its evaluation are as follows:

1. Does the proposed approach create a valueable framework for generating innovativ solutions for design challenges within the field of UI?
2. Does the proposed approach reach the goal of enhancing the participants relationship and also empower a vast number of stakeholders?

The next step on our research agenda is to host a series of participatory ADR workshops conducted with DT as a process model. The evaluation of this case study will generate insights on the apllicability and usefulness of the proposed process as well as meaningful input for the adaption and improvement of participatory ADR processes in general.

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